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A cont
a first slab waveguide disposed on said substrate and connecting said first channel waveguide with said parabolized channel waveguide array;

a second slab waveguide disposed on said substrate and connecting an end of said channel waveguide array on the side wherein said first slab waveguide has not been connected thereto with an end thereof; and

a second channel waveguide disposed on said substrate and connected to the other end of said second slab waveguide wherein a waveguide part in the connected area has a parabolic configuration.

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4. (Amended) An arrayed waveguide grating as claimed in claim 1, wherein said waveguide part parabolic configuration is individually adjusted in response to respective wavelengths of multiplexed optical signals input to said first channel waveguide.

Please add the following new claims:

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-- 10. (New) The arrayed waveguide grating of claim 1, wherein said waveguide part is formed as a parabolic configuration, wherein said parabolic configuration can be defined by a quadratic function.

11. (New) The arrayed waveguide grating of claim 10, wherein a width $W(z)$ of the waveguide part is equal to

$$\{2\alpha\lambda/n_{\text{eff}}(L-Z) + Wc^2\}^{1/2}$$

wherein α is a parabolic coefficient, λ is an optical wavelength of an optical transmission signal, n_{eff} is an effective index, Wc is a core width of the second channel optical waveguide,

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and Z is the width of the parabolic waveguide part at length L .

12. (New) The arrayed waveguide grating of claim 1, wherein the waveguide part has a core width measuring from approximately one to five times a width of a Gaussian distribution produced in a boundary between the second slab waveguide and the second channel waveguide.

13. (New) The arrayed waveguide grating of claim 1, wherein said parabolic waveguide part is adjusted to compensate for varying optical transmission widths and insertion loss of said optical transmissions.

14. (New) The arrayed waveguide grating of claim 1, wherein said first sector slab waveguide comprises a second parabolic waveguide part.

15. (New) The arrayed waveguide of claim 11, wherein the core width at the perimeter of said parabolic waveguide part is formed in common with varying wavelengths of multiplexed optical signals input to said first channel waveguide.

16. (New) A method for multiplexing-demultiplexing an optical transmission, comprising:

forming an arrayed waveguide grating on a substrate;

forming a first channel waveguide on the substrate;

forming a second channel waveguide on said substrate;

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forming a parabolized channel waveguide array on the substrate, wherein each length of the waveguides in the array is sequentially longer;

connecting, with a first slab waveguide, said first channel waveguide to a first end of said channel waveguide array;

connecting, with a second slab waveguide, a second end of said channel waveguide array to said second channel waveguide;

forming a parabolic waveguide part connecting to an end of the second channel waveguide opposite to an end connected to the second slab waveguide.

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17. (New) The method of claim 16, wherein said forming a parabolized channel waveguide array forms said array with a predetermined difference in the lengths of the waveguides.

18. (New) The arrayed waveguide grating of claim 16, wherein said forming a parabolic waveguide part forms an adjustable parabolic waveguide part.

19. (New) The method of claim 16, wherein said forming said waveguide part comprises forming a parabolic width $W(z)$ that equals

$$\{2\alpha\lambda/n_{\text{eff}}(L-Z) + Wc^2\}^{1/2}$$

wherein α is the parabolic coefficient, λ is the optical wavelength of the optical transmission, n_{eff} is an effective index, Wc is a width of an outputting channel optical waveguide, and Z is the parabolic width at length L .

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20. (New) The method of claim 19, wherein the forming the core opening width comprises forming widths from approximately one times to five times a width of a Gaussian distribution produced in a boundary between the second slab waveguide and the second channel waveguide.

21. (New) The method of claim 16, further comprising:
adjusting the waveguide part to compensate for varying optical transmission widths and insertion loss of the optical transmissions.

22. (New) The method of claim 16, wherein the forming the first slab waveguide comprises forming a second parabolic waveguide part on said substrate.

23. (New) The method of claim 16, wherein the forming the core opening width comprises forming the core width in common with varying wavelengths of multiplexed optical signals input to said first channel waveguide.

24. (New) An arrayed waveguide grating, comprising:
a substrate;
a first channel waveguide disposed on the substrate;
a parabolized channel waveguide array, disposed on said substrate, comprising parabolized waveguides
a first slab waveguide disposed on said substrate and connecting said first channel waveguide with said parabolized channel waveguide array;

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a second slab waveguide disposed on said substrate and connecting an end of said channel waveguide array on the side wherein said first slab waveguide has not been connected thereto with an end thereof.

25. (New) The arrayed waveguide grating of claim 24, wherein said parabolized channel waveguide array is formed such that each length of said parabolized waveguides is sequentially longer.

26. (New) The arrayed waveguide grating of claim 24, further comprising:
a waveguide part; and
a second channel waveguide disposed on said substrate and connected to the other end of said second slab waveguide,
wherein said waveguide part in the connected area has a parabolic configuration.

27. (New) The arrayed waveguide grating of claim 26, wherein said parabolic configuration of said waveguide part is adjustable.

28. (New) The arrayed waveguide grating of claim 26, wherein said waveguide part parabolic configuration is individually adjusted in response to respective wavelengths of multiplexed optical signals input to said first channel waveguide.